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November 2, 2001

TO: Internal File

THRU: Susan M. White, Team Lead *SMW*

FROM: James D. Smith, Reclamation Specialist *JDS*

RE: Upper Pad Reclamation, PacifiCorp, Des Bee Dove Mine, C/015/017-AM01A-1

SUMMARY:

The mines in the Des-Bee-Dove area pre-date SMCRA, mine operations having been documented by the USGS in 1922. As the Beehive Mine and Little Dove Mines were developed, overburden was excavated and graded to make the mine pads and disturbed soils were neither classified nor salvaged; however, soil surveys were done in 1980, 1983, 1990, 2000, and 2001. Overburden was used to expand the pad area for the two mines and to divert a small drainage at the south end of the pad, and in the 1970's, bin walls and large boulders were placed below the pad to stabilize it and protect the Deseret Mine below. A narrow road was developed off the East Mountain Cattle Access Trail to provide access to a substation and water tank.

Utah Power and Light purchased the mines in 1972. The mines were temporarily sealed in 1987. In 1999 the portals were backfilled and - except for guardrails, a large drop-inlet structure, and several culverts - the surface facilities were removed.

What the permittee refers to as Phase I disturbed area is the Beehive and Little Dove pad and portal area and the tank - substation access road, plus the road from this upper area down to the Deseret Mine pad. Reclamation of this Phase I area will involve removal of remaining structures, restoration to approximate original contour (AOC), revegetation of the recontoured surface, and reestablishment of four minor drainages - three at the mine pad and one near the water tank pad.

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TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

Volume 8 of the Des-Bee-Dove MRP covers the geology of these mines in detail, but a brief section (600-Geology) describing the geology of the immediate area is included in Appendix XIV.

The Beehive and Little Dove Mines were developed in the Blind Canyon Seam. Dip of this seam is approximately 20° to the west or west-northwest in the Des-Bee-Dove area. The Des-Bee-Dove Mines lie in an area with complex series of normal faults that strike roughly north-south. The Beehive Mine removed coal between the Stump Flat fault on the east and the Maple Gulch fault on the west, and the Little Dove Mine exploited the coal between the Maple Gulch and Deer Creek Canyon faults: the Deer Creek fault separates the Des-Bee-Dove Mines from the Deer Creek and Wilberg Mines.

Samples collected from mines operated by PacifiCorp in both East and Trail Mountains indicate very low pyritic sulfur and high neutralization potential, so acid-mine drainage will not be a problem: analysis results are tabulated in Appendix A of section 600-Geology of Appendix XIV. Furthermore, because of the dip of the beds, the orientation of the portals and entries, and the dryness of the mines (these mines were dry and water from an outside source was required for dust suppression), post-mining gravity discharge will not occur.

The permittee states on page 7 of section 600 that there has been no exploration drilling within the area of the Des-Bee-Dove Phase I Reclamation.

Findings:

The geologic resource information in Volume 8 of the MRP and in Appendix XIV is considered adequate to meet the requirements of this coal mining rules.

RECLAMATION PLAN

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The proposed plan states that, because of the restricted site configuration, reconstruction of the drainages will dictate the actual extent to which fill can be placed (Section 553.110, page 15). This is a major concern at the Division, especially in drainage #3 (Drawings CS1817C and CS1814D) where the dip of the sandstone ledge above the Beehive portals will naturally divert water towards the placed fill and the drop from the ledge will concentrate erosive power at the base of the ledge. No purpose will be served in covering the entire cut to the top if water erodes the fill or saturates the fill and causes it to slide.

Findings:

From the point of view of hydrology, the AOC information in this section is considered adequate to meet the requirements of this coal mining rules.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

Mining in the Des-Bee-Dove area predates SMCRA, going back to the late 19th century. It's not clear when the Beehive Mine was initially developed, but a shaft from the Deseret Mine up to the Beehive was constructed sometime in the 1950's to transport coal from the Beehive Mine to the surface by way of the Deseret Mine. Little Dove was constructed in the mid-1970's. The Beehive and Little Dove Mines each had three portals. The mines were temporarily sealed in 1987. In 1999 the portals were backfilled and the surface facilities removed. The planned reclamation will place additional fill and growth medium over the sealed portals. Water will not drain towards the sealed portals. The Little Dove portals and main entries are aligned almost directly downdip and no portion of the mine is at a higher elevation than the portals. The Beehive Mine portals and main entries are oriented close to strike of the coal seam but have a slight downward slope; most of the mine is at an elevation lower than the portals and there is no direct flowpath from the higher areas to the portals.

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Findings:

From the point of view of hydrology, the information in this section is considered adequate to meet the requirements of this coal mining rules

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

General

The Beehive and Little Dove Mines are in an unnamed canyon that is tributary to Grimes Wash. Hydrologic resources of the entire East Mountain area, which includes the Cottonwood/Wilberg, Deer Creek, and Des-Bee-Dove Mines, are described in Volume 9 - Hydrologic Section.

No ground-water resources have been documented in the Phase I Reclamation Area, the strata east of the Deer Creek Canyon fault being essentially dry. There are some small springs farther down the canyon that will not be affected by this phase of the reclamation.

The Phase I Reclamation Area is in a small, unnamed drainage that is tributary to Grimes Wash and part of the Cottonwood Canyon Creek drainage. The pad for the Beehive and Little Dove Mines was built across three small, ephemeral channels at the head of this drainage. These drainages normally flow only in response to storm events. The channel at the south end was diverted around the Beehive and Little Dove pad by a berm. Flow from the other two channels crosses the Beehive and Little Dove pad, enters a 48-inch culvert that carries the flow down to the main tippie pad, and from there reports to the sedimentation pond below the minesite. Another small drainage by the water tank was disrupted by construction of the road to the tank pad.

For reclamation of this Phase I area, channel and slope stability are more important than getting the fill all the way to the top of the cut slope. The channel and the filled slopes should be designed and built so that water cannot get from the channel into the fill and destabilize it. The proposed plan states that, because of the restricted site configuration, reconstruction of the drainages will dictate the actual extent to which fill can be placed (Section 553.110, page 15). This is a major concern at the Division, especially in drainage #3 (Drawings CS1817C and CS1814D) where the dip of the sandstone ledge above the Beehive portals will naturally divert water towards the placed fill and the drop from the ledge will concentrate erosive power at the

base of the ledge. No purpose will be served in covering the entire cut to the top if water from drainage #3, or any drainage, erodes the fill or saturates the fill and causes it to slide.

Materials used to construct the channels will be gradational from fine material at bottom to coarse at top, as shown in Drawing CS1819A, and on Plate 4 - 1 - sheet 2 of 5 in Volume 4. The engineered channels will be embedded into the fill. The plan states several times that boulders will be removed from fill materials so that proper compaction can be obtained, but beyond merely separating out boulders, some method will be needed on site to obtain adequately graded materials. Boulders and coarse materials need to be placed so as to be stable, not just dumped.

Acid and toxic-forming materials

Samples collected from mines operated by PacifiCorp in both East and Trail Mountains indicate very low pyritic sulfur and high neutralization potential. Analysis results are tabulated in Appendix A of section 600-Geology of Appendix XIV.

Discharges into an underground mine

Mine openings are sealed, backfilled, and will be covered with additional material during reclamation. There will be no surface drainage towards the buried portals and no discharge into underground mines.

Gravity discharges

The mines were temporarily sealed in 1987 and in 1999 the portals were backfilled. The planned reclamation will place additional fill and growth medium over the sealed portals. The Little Dove portals and main entries are aligned almost directly down dip and no portion of the mine is at a higher elevation than the portals. The Beehive Mine portals and main entries are oriented close to strike of the coal seam but have a slight downward slope; most of the mine is at an elevation lower than the portals and there is no direct flowpath from the higher areas to the portals. Furthermore, these mines were dry and required outside sources of water for dust control and other mine operations.

Water quality standards and effluent limitations

Monitoring of surface water will continue at the sedimentation pond outfall, UPDES permit UTG040022, which is the only monitoring site in the Des-Bee-Dove permit area. Monitoring will continue until release of the reclamation bond or an earlier appropriate date determined through consultation with the Division and other local, state, and federal agencies. The permittee commits that any discharges will be made in compliance with Utah and federal water-quality laws and regulations and with effluent limitations for coal mining promulgated by the EPA, as set forth in 40CFR Part 434. The current monitoring plan in Volume 9 calls for

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additional monitoring points immediately above and below the sedimentation pond site after the pond is removed.

A monitoring point just outside the upper disturbed area boundary could measure flow and sediment concentrations and other water-quality factors in runoff from the reclaimed areas and could be a means of demonstrating the effectiveness of the sediment control measures. But, because streamflows in this canyon are from summer thundershowers or snowmelt and generally of high-intensity and short duration, the real value of such a monitoring point in achieving this purpose is questionable.

Diversions

All diversions and drainage control structures constructed for mine operations will be removed. Flows will be returned to reconstructed channels at the approximate locations of the original, natural channels.

Calculations for peak storm discharge and volume used to design these constructed channels are in Appendix A. Calculations were done using the STORM program, which is available through OSMRE's TIPS program. An SCS Upland Curve 7 - ephemeral channel - was used. The rest of the parameters are given in pages 22 to 26 and in Appendix A. Results are summarized in Table 7-1 on page 26.

Calculations for channel design, including filter design and riprap sizing, were done using FlowMaster (version 5.13), based on Manning's equation. Calculation methodology for the filter design and riprap-sizing is explained on pages 26 through 32, and the results of the calculations are in Appendix A. The best combination of water velocity and channel width and depth was sought through an iterative process that tried to balance the costs of constructing narrower but deeper channels against installing additional riprap in shallower but wider channels. Channel dimensions, expected flow characteristics, and D50 riprap requirements are summarized in Table 7-2 on page 29, and trapezoidal channel designs results are in Appendix A.

Channels 2 and 3 are to be lined with riprap. The equations used for the filter design and riprap-sizing are on page 30, and the results of the calculations are at the end of Appendix A. The Procedural Steps of Reclamation Table in Section 540 states that sieve analysis will be done to assure riprap gradation meets design criteria. Materials for constructing these channels are to be obtained on-site. Riprap sizes should be varied rather than uniform. Riprap should be angular rather than rounded: boulders that will be excavated on-site may be more rounded than is desirable and a method of breaking them into more angular material may be needed. The permittee states in the September 15 cover letter that they do not anticipate a need to crush or break boulders available on site to obtain appropriate angular material because most available boulders are the result of recent weathering and tend to be angular rather than rounded.

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Drawing CS1819A shows schematic cross-sections of channels 2 and 3. The soil immediately adjacent to the channel will overlap the uppermost riprap and cover the upper edge of the engineered channel. This will provide a transition from the constructed channel to soil and avoid a visible, hard edge. This transition will not only be visually more like the existing channels, but will promote vegetation growth in the coarser material, which helps anchor it; and eliminate an edge that could facilitate and concentrate erosion parallel to the channel.

It is stated several times in the plan that boulders, acquired on-site, will be placed along the channels as erosion protection. Consideration should be given to using the largest boulders to create ledges to break the uniformity of the channel gradient. These should be imbedded into the fill and the filter and riprap placed around them, rather than placing these large boulders on top of the filter material, which would allow flow to go under them. Using these large boulders as artificial ledges would require extra attention to the construction of the streambed on the downstream side, and such measures as extra riprap or drop-pools might be needed.

Channel designs are based on an average gradient along the length of the designed channel; however, the gradient down the face of the sandstone ledge immediately above the head of channel 3 is much greater than that used in the calculations (profile A - Drawing CS1817C), and flow may even form a waterfall under extreme conditions. A transitional apron has been designed and certified by a professional engineer, based on design criteria from Hansen, Allen and Luce, Inc. The design and calculations are in Appendix A and are discussed on pages 28 and 29. D50 for the apron will be 4.5 feet (pages 29 and 30)

Experience has shown that channels built on fill are subject to many problems, including failure, if not constructed correctly. Acknowledging that it is the permittee who has the authority to control, direct, and supervise construction of the reclamation channels, the Division would like to have a hydrologist or other Division representative present during placement of the filter and riprap. The permittee has stated, in the cover letter dated September 15, 2001, that they expect division representatives to be at the site as much as possible during construction to facilitate communication, and that they will make every effort to keep the division informed on progress and timing of construction.

Sediment control measures

Sediment will be controlled principally by restoring vegetative cover. Tackifier will be used on restored surfaces to temporarily control sediment runoff until vegetation becomes established. (R645-301-341 implies only hydroseeded areas will receive wood-fiber mulch and tackifier.) Weed-free alfalfa will be incorporated into the soil at a rate of 2,000 lbs/acre. (R645-301-341). Surfaces will be roughened by deep gouging to retain sediment and moisture and to mix the straw mulch into the upper portion of the soil. Rock litter on the surface will also aid in sediment control, and enhance vegetation establishment, create micro-habitats, and help provide a natural aesthetic appearance (R645-3101-244). If erosion is identified during routine monitoring or monitoring after precipitation events, silt fence will be installed and, if needed, the

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surface will be enhanced and reseeded. No method other than examination in the field is proposed to evaluate the success of these sediment control measures.

The minor drainage near the water tank pad will be reestablished utilizing an excavator/backhoe. Riprap will not be needed, but boulders acquired on-site will be placed along the channel as erosion protection. The reclaimed area will be blended to resemble the section of the drainage above the access road.

The three drainages at the mine pad will be reestablished using an excavator/backhoe and will be blended to resemble the section of the drainage above the access road. Boulders acquired on-site will be placed along the channels as erosion protection. Channels have been designed to be capable of handling a 100-yr, 6-hour storm: designs are in Appendix A of Appendix XIV. Channels 2 and 3 will require riprap gradation, which is described in Riprap Gradation Calculations for Filter Design in Appendix A.

Siltation structures

Basins, traps, straw bales, etc. are proposed for sediment control during the construction phase of reclamation. Weed-free alfalfa will be incorporated into the soil. When reclamation is complete, pocking or roughening of the surface and rock litter and boulders will assist in sediment control. When vegetation has become established, the sedimentation pond will be removed with the Division's approval (R645-301-541). (Seed mixture and seeding and planting techniques and methodologies are outlined in Volume 2, Part 4. Methods for maintenance and monitoring for the ten-year responsibility are in Section R645-301-300.)

There is no standard proposed to determine the success of these proposed sediment-control methods. RUSLE or similar methods can provide an estimate of sediment contribution from reclaimed and undisturbed watersheds (as was done at the nearby Deer Creek Mine); however, there do not appear to be water-quality or sediment load baseline data for this Des-Bee-Dove drainage to allow a similar comparison: this lack of baseline or background data will need to be accounted for in any method used to evaluate the effectiveness of the proposed sediment control measures. Such an evaluation may indicate the proposed measures are not adequate and more robust methods of sediment control are needed for this steep, dry, rocky, exposed site..

Sediment levels above background levels are not expected (R645-301-242.130). Background levels for this site are not known. RUSLE could provide at least a calculated estimate of the expected sediment levels.

There is a commitment on page 33 in Section 763 to retain and maintain all temporary sedimentation structures, including the berm along the access road, until completion of sequenced reclamation beginning at the south end of the pad, proceeding north to the main portal pad area, and finally to the access road.

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The role of the sedimentation pond in this reclamation plan is not clear. Reclaimed areas will continue to report to the sedimentation pond (R645-301-553.100, p. 12). The sedimentation pond will remain until vegetation is established (R645-301-541) and the Division approves its removal; however, sediment should be controlled before it leaves the reclaimed area, so the sedimentation pond should not be needed. Furthermore, Henry Austin of OSM has expressed his opinion that if the sedimentation pond is to be used for sediment control, the entire drainage between the mine-site and the pond needs to be permitted.

Findings:

The information in this section is not sufficient to meet the requirements of this coal mining rules. Prior to approval, the applicant must respond adequately to the following deficiencies:

R645-301-731.224.1, -742.110, -742.210, There is no standard or method described that can be used to determine the success of the proposed sediment-control methods. The computer code RUSLE (from NRCS) or equivalent methods can provide an estimate of sediment contribution from reclaimed and undisturbed watersheds; however, there do not appear to be water-quality or sediment load baseline data for this Des-Bee-Dove drainage to allow a comparison such as was done at the nearby Deer Creek Mine: this lack of baseline or background data will need to be accounted for in any method used to evaluate the effectiveness of the proposed sediment control measures. Such an evaluation may indicate the proposed measures are not adequate and more robust methods of sediment control are needed for this steep, dry, rocky, exposed site.

R645-301-742.220, -121.200, The role of the sedimentation pond in this reclamation plan is not clear. Reclaimed areas will continue to report to the sedimentation pond (R645-301-553.100, p. 12). The sedimentation pond will remain until vegetation is established (R645-301-541) and the Division approves its removal; however, sediment should be controlled before it leaves the reclaimed area, so the sedimentation pond should not be needed. Furthermore, Henry Austin of OSM has expressed his opinion that if the sedimentation pond is to be used for sediment control, the entire drainage between the mine-site and the pond needs to be permitted.

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CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

A CHIA for the East Mountain area was updated in 1994. This modification of the Reclamation plan does not require modification or updating of the CHIA.

RECOMMENDATION:

This revision of the reclamation plan should not be approved until the listed deficiencies have been adequately resolved.

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